Name: ANSWER KEY Date: _____

Solving Equations by Factoring
Algebra 2
Section 5.3

Solve each equation by removing the GCF and applying the Zero Product Principle.

1. $4x^2 - 8x = 0$
$4x(x-2)=0$
$4x=0 \quad x-2=0$
$x=0 \quad x=2$

2. $3x^2 - 18x = 0$
$3x(x-6)=0$
$3x=0 \quad x-6=0$
$x=0 \quad x=6$

3. $5x^2 - 25x = 0$
$5x(x-5)=0$
$5x=0 \quad x-5=0$
$x=0 \quad x=5$

4. $3x^2 - 48 = 0$
$3(x^2-16)=0$
$3(x-4)(x+4)=0$
$x-4=0 \quad x+4=0$
$x=4 \quad x=-4$

5. $16x^3 + 32x^2 = 0$
$16x^2(x+2)=0$
$16x^2=0 \quad x+2=0$
$x=0 \quad x=-2$

6. $3x^3 + 51x^2 = 0$
$3x^2(x+17)=0$
$3x^2=0 \quad x+17=0$
$x=0 \quad x=-17$

7. $x(4x+5) - 4(4x+5) = 0$
$4x+5=0 \quad x-4=0$
$x=-\frac{5}{4} \quad x=4$

8. $(2x+3)3 - (2x+3)x = 0$
$2x+3=0 \quad 3-x=0$
$x=-\frac{3}{2} \quad x=3$

9. $x(x+8) - 4(x+8) = 0$
$x+8=0 \quad x-4=0$
$x=-8 \quad x=4$

Solve each equation by <u>factoring</u> and applying the Zero Product Principle

10. $x^2 + 11x + 18 = 0$
$(x+9)(x+2)=0$
$x+9=0 \quad x+2=0$
$x=-9 \quad x=-2$

11. $x^2 - 8x + 7 = 0$
$(x-7)(x-1)=0$
$x-7=0 \quad x-1=0$
$x=7 \quad x=1$

12. $x^2 - 9x + 14 = 0$
$(x-7)(x-2)=0$
$x-7=0 \quad x-2=0$
$x=7 \quad x=2$

13. $x^2 - x - 12 = 0$
$(x-4)(x+3)=0$
$x-4=0 \quad x+3=0$
$x=4 \quad x=-3$

14. $x^2 - 37x + 36 = 0$
$(x-36)(x-1)=0$
$x-36=0 \quad x-1=0$
$x=36 \quad x=1$

15. $x^2 + 37x + 36 = 0$
$(x+36)(x+1)=0$
$x+36=0 \quad x+1=0$
$x=-36 \quad x=-1$

16. $x^2 - 14x + 33 = 0$
$(x-11)(x-3)=0$
$x-11=0 \quad x-3=0$
$x=11 \quad x=3$

17. $x^2 - 10x + 21 = 0$
$(x-7)(x-3)=0$
$x-7=0 \quad x-3=0$
$x=7 \quad x=3$

18. $x^2 + 21x - 100 = 0$
$(x+25)(x-4)=0$
$x+25=0 \quad x-4=0$
$x=-25 \quad x=4$

19. $x^2 + 20x + 51 = 0$
$(x+17)(x+3)=0$
$x+17=0 \quad x+3=0$
$x=-17 \quad x=-3$

20. $x^2 - 30x + 81 = 0$
$(x-27)(x-3)=0$
$x-27=0 \quad x-3=0$
$x=27 \quad x=3$

21. $x^2 - 12x - 45 = 0$
$(x-15)(x+3)=0$
$x-15=0 \quad x+3=0$
$x=15 \quad x=-3$

Solve each equation by factoring and applying the Zero Product Principle

22. $2x^2+3x-5=0$

$(2x^2-2x)+(5x-5)=0$

$2x(x-1)+5(x-1)=0$

$2x+5=0 \quad x-1=0$

$x=-\frac{5}{2} \quad x=1$

23. $8x^2-6x+1=0$

$(8x^2-4x)+(-2x+1)=0$

$4x(2x-1)-1(2x-1)=0$

$4x-1=0 \quad 2x-1=0$

$x=\frac{1}{4} \quad x=\frac{1}{2}$

24. $4x^2+9x+5=0$

$(4x^2+4x)+(5x+5)=0$

$4x(x+1)+5(x+1)=0$

$4x+5=0 \quad x+1=0$

$x=-\frac{5}{4} \quad x=-1$

25. $3x^2+10x+7=0$

$(3x^2+3x)+(7x+7)=0$

$3x(x+1)+7(x+1)=0$

$3x+7=0 \quad x+1=0$

$x=-\frac{7}{3} \quad x=-1$

26. $3x^2-5x-2=0$

$(3x^2-6x)+(1x-2)=0$

$3x(x-2)+1(x-2)=0$

$3x+1=0 \quad x-2=0$

$x=-\frac{1}{3} \quad x=2$

27. $6x^2-13x-15=0$

$(6x^2-18x)+(5x-15)=0$

$6x(x-3)+5(x-3)=0$

$6x+5=0 \quad x-3=0$

$x=-\frac{5}{6} \quad x=3$

28. $12x^2+17x+6=0$

$(12x^2+8x)+(9x+6)=0$

$4x(3x+2)+3(3x+2)=0$

$4x+3=0 \quad 3x+2=0$

$x=-\frac{3}{4} \quad x=-\frac{2}{3}$

29. $15x^2-7x-2=0$

$(15x^2-10x)+(3x-2)=0$

$5x(3x-2)+1(3x-2)=0$

$5x+1=0 \quad 3x-2=0$

$x=-\frac{1}{5} \quad x=\frac{2}{3}$

30. $3x^2-5x-2=0$

$(3x^2-6x)+(1x-2)=0$

$3x(x-2)+1(x-2)=0$

$3x+1=0 \quad x-2=0$

$x=-\frac{1}{3} \quad x=2$

Solve each equation by factoring and applying the Zero Product Principle

31. $x^2-6x+9=0$

$(x-3)(x-3)=0$

$x-3=0$

$x=3$

32. $x^2-24x+144=0$

$(x-12)(x-12)=0$

$x-12=0$

$x=12$

33. $x^2+24x+144=0$

$(x+12)(x+12)=0$

$x+12=0$

$x=-12$

34. $x^2-18x+81=0$

$(x-9)(x-9)=0$

$x-9=0$

$x=9$

35. $x^2+14x+49=0$

$(x+7)(x+7)=0$

$x+7=0$

$x=-7$

36. $x^2+2\sqrt{2}x+2=0$

37. $x^2-25=0$

$(x-5)(x+5)=0$

$x-5=0 \quad x+5=0$

$x=5 \quad x=-5$

38. $x^2-169=0$

$(x-13)(x+13)=0$

$x-13=0 \quad x+13=0$

$x=13 \quad x=-13$

39. $x^2-225=0$

$(x-15)(x+15)=0$

$x-15=0 \quad x+15=0$

$x=15 \quad x=-15$

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Name_____

Solving Quadratic Equations by Factoring

Date_____ Period____

Solve each equation by factoring.

1) $(k+1)(k-5)=0$

$K+1=0$ $K-5=0$

$K=-1$ $K=5$

2) $(a+1)(a+2)=0$

$a+1=0$ $a+2=0$

$a=-1$ $a=-2$

3) $(4k+5)(k+1)=0$

$4K+5=0$ $K+1=0$

$K=-\frac{5}{4}$ $K=-1$

4) $(2m+3)(4m+3)=0$

$2m+3=0$ $4m+3=0$

$m=-\frac{3}{2}$ $m=-\frac{3}{4}$

5) $x^2-11x+19=-5$

$x^2-11x+24=0$

$(x-8)(x-3)=0$

$x-8=0$ $x-3=0$

$x=8$ $x=3$

6) $n^2+7n+15=5$

$n^2+7n+10=0$

$(n+5)(n+2)=0$

$n+5=0$ $n+2=0$

$n=-5$ $n=-2$

7) $n^2-10n+22=-2$

$n^2-10n+24=0$

$(n-6)(n-4)=0$

$n-6=0$ $n-4=0$

$n=6$ $n=4$

8) $n^2+3n-12=6$

$n^2+3n-18=0$

$(n+6)(n-3)=0$

$n+6=0$ $n-3=0$

$n=-6$ $n=3$

9) $6n^2-18n-18=6$

$6n^2-18n-24=0$

$6(n^2-3n-4)=0$

$6(n-4)(n+1)=0$

$n-4=0$ $n+1=0$

$n=4$ $n=-1$

10) $7r^2-14r=-7$

$7r^2-14r+7=0$

$7(r^2-2r+1)=0$

$7(r-1)(r-1)=0$

$r-1=0$ $r-1=0$

$r=1$ $r=1$

10) $n^2 + 8n = -15$

$n^2+8n+15=0$

$(n+3)(n+5)=0$

$n+3=0$ $\quad n+5=0$

$n=-3$ $\quad n=-5$

12) $5r^2 - 44r + 120 = -30 + 11r$

$5r^2-55r+150=0$

$5(r^2-11r+30)=0$

$5(r-6)(r-5)=0$

$r-6=0$ $\quad r-5=0$

$r=6$ $\quad r=5$

13) $-4k^2 - 8k - 3 = -3 - 5k^2$

$k^2-8k=0$

$k(k-8)=0$

$k=0$ $\quad k-8=0$

$k=8$

14) $b^2 + 5b - 35 = 3b$

$b^2+2b-35=0$

$(b+5)(b+7)=0$

$b-5=0$ $\quad b+7=0$

$b=5$ $\quad b=-7$

15) $3r^2 - 16r - 7 = 5$

$3r^2-16r-12=0$

$(3r^2-18r)+(2r-12)=0$

$3r(r-6)+2(r-6)=0$

$3r+2=0$ $\quad r-6=0$

$r=-\frac{2}{3}$ $\quad r=6$

16) $6b^2 - 13b + 3 = -3$

$6b^2-13b+6=0$

$(6b^2-9b)+(4b+6)=0$

$3b(2b-3)-4(2b-3)=0$

$3b-4=0$ $\quad 2b-3=0$

$b=\frac{4}{3}$ $\quad b=\frac{3}{2}$

17) $7k^2 - 6k + 3 = 3$

$7k^2-6k=0$

$k(7k-6)=0$

$k=0$ $\quad 7k-6=0$

$k=\frac{6}{7}$

18) $35k^2 - 22k + 7 = 4$

$35k^2-22k+3=0$

$(35k^2-15k)+(-7k+3)=0$

$5k(7k-3)-1(7k-3)=0$

$5k-1=0$ $\quad 7k-3=0$

$k=\frac{1}{5}$ $\quad k=\frac{3}{7}$

19) $7x^2 + 2x = 0$

$x(7x+2)=0$

$x=0$ $\quad 7x+2=0$

$x=-\frac{2}{7}$

20) $10b^2 = 27b - 18$

$10b^2-27b+18=0$

$(10b^2-15b)+(-12b+18)=0$

$5b(2b-3)-6(2b-3)=0$

$5b-6=0$ $\quad 2b-3=0$

$b=\frac{6}{5}$ $\quad b=\frac{3}{2}$

21) $8x^2 + 21 = -59x$

$8x^2+59x+21=0$

$(8x^2+56x)+(3x+21)=0$

$8x(x+7)+3(x+7)=0$

$8x+3=0$ $\quad x+7=0$

$x=-\frac{3}{8}$ $\quad x=-7$

22) $15a^2 - 3a = 3 - 7a$

$15a^2+4a-3=0$

$(15a^2+9a)+(-5a-3)=0$

$3a(5a+3)-1(5a+3)=0$

$3a-1=0$ $\quad 5a+3=0$

$a=\frac{1}{3}$ $\quad a=-\frac{3}{5}$